# Gridworks Solar PV Basics
# Course syllabus

**Unit 1 – Introduction to Renewable Energy**

- Overview of the PV industry past and present including history of PV
- Different types of financial incentives and policies from around the world
- Environmental impacts
- Energy efficiency and reduced consumption
- Why energy efficiency is important when it comes to a renewable energy like PV
- Other forms of renewables (solar hot water, wind, geothermal, etc.)
- Different careers available in the industry and how to attain them

**Unit 2 – PV Systems and Electrical Components**

- Examine basic components for electrical and PV systems including racking, RSDs, and building entrance methods
- Certification of equipment
- Discuss the components required for different types of PV systems (ex. grid-connected and off-grid battery based systems)
- Discuss grid connected and off grid differences and economics of each
- We will look at how a grid-connected PV system works, looks and behaves and discuss how a grid-connected system works with different types of regulations and incentives (ex. FIT's and Net-Metering)

**Unit 3 – PV Modules and Electrical Theory**

- Describe how a PV cell/module produces electricity from sunlight
- Discuss how temperature and irradiance fluctuations can have a significant effect on PV cells, modules, arrays and the design of PV systems (there will be labs for testing modules at this point)
- Show I-V (current-voltage) curve characteristics of modules, arrays, and PV system designs
- Explain MPPT (Maximum Power Point Tracking) and it's uses

**Unit 4 – Site Analysis and Mounting Solutions**

- Discuss site analysis, planning, and implementation
- Discuss the need to understand the following factors and how they apply to PV systems and yearly energy production:
    - Azimuth (orientation)
    - Tilt angle
    - Shading, debris, other losses
    - Roof type (material and condition)
- Discuss the different mounting methods, costs associated, pros and cons with each type, and why you would choose one mounting method over another

## Unit 5 – Grid-Connected PV Systems

- Discuss system sizing for a client's needs, desires, and/or budget
- Address energy efficiency and why it's important for people who are considering a grid-connected PV system
- Sizing a system requires addressing a client's habits when consuming (electrical) energy and the property's ability or inability to accommodate a PV system
- Explain how to determine whether there is a need for any upgrades to the structure, electrical system, and/or property

## Unit 6 – Off Grid PV Systems

- Discuss equipment and components used in off-grid PV installations

## Unit 7 – Canadian Electrical Code Requirements and Documentation

- Examine the Canadian Electrical code and its significance in this industry
- Discuss the requirement for qualified personnel to be working on solar PV systems

**Please Note**: As per the Province or Alberta's Electrician Trade Regulation 274/2000, anyone who is not a Certified Electrician or Registered Electrical Apprentice will have to sign an "Acknowledgment and Release Waiver" stating that this training will not qualify you to design or install solar photovoltaic (PV) systems, and you will not be a certified solar PV installer as a result of completing the course. Further, you must understand and acknowledge that the installation, alteration, repair, inspection, verification, commissioning, maintenance, and operation of electrical systems, including solar PV systems, must be performed by a certified Electrician.